were ſo divided, that they never fell to the Earth, but were exhaled up into the Clouds.

In the ſaid ſmall Particles of Water are conveyed the above-mentioned ſmall *Animalcula* far up into the Land, and when the Ground becomes dry, they contract themſelves into an oval Figure, and the Pores of their Skin are ſo well clos'd, that they do not perſpire at all, whereby they preſerve themſelves till it Rains, upon which they open their Bodies and enjoy the moiſture. And thus, in my poor opinion, it happens that we find theſe *Animalcula* in every Meadow of our Country, none of which are very remote from the Sea or Water Canals.

II. Solutio Problematis.

A Clariſſ. viro D. Jo. Bernoulli in Diario Gallico Febr. 1403. Propoſiti.

Quam D. G. Cheynæo communicavit Jo. Craig.

PRoblema. Propoſitæ Curvæ Geometricæ alias innumeras Longitudine Æquales invenire.

Solutio. Sint w, s, co-ordinatæ Curvæ datæ ; & Curvæ quæſitæ ſint co-ordinatæ x, y : tum ex conditione Problematis erit $dw^2 + ds^2 = dx^2 + dy^2$. Ponatur $dx = dw - m\,dz$, unde erit $dy = \sqrt{ds^2 + 2m\,dw\,dz - m^2\,dz^2}$; in hac pro ds ſubſtituatur ejus valor per w, dw & determinatas expreſſus : & pro dz aſſumatur talis valor ex w, dw & determinatis compoſitus, ut valores quantitatum dx, dy ſint ſummabiles : Et ſic habentur x ac y Co-ordinatæ Curvæ quæſitæ. Q. E. J.

Exemplum 1. Invenire Curvam æqualem Lineæ Parabolicæ. Sit $2a$ latus rectum Parabolæ ; adeoq; $2as$

$ds = w^2$ unde $ds^2 = a^{-2} w^2 dw^2$ adeoque $dy = \sqrt{a^{-2} w^2 dw^2 + 2m\, dw\, dz - m^2 dz^2}$; ut hæc sit summabilis assumatur $m\, dz = \frac{w^2 dw}{a^2}$ unde $dx = dw - a^{-2} w^2 dw$: $dy = dw \sqrt{3a^{-2} w^2 - a^{-4} w^4}$ quarum integrales per Methodos dudùm cognitas inveniantur $x = w - \frac{w^3}{3a^2}$ $y = \frac{w^2 - 3a^2}{3a^2} \sqrt{3a^2 - w^2}$.

Exemp. 2. Invenire Curvam æqualem Circulari. Sit a radius Circuli; tum $s = \sqrt{a^2 - w^2}$: unde $ds^2 = \frac{w^2 dw^2}{a^2 - w^2}$; & proinde erit $dy = \sqrt{\frac{w^2 dw^2}{a^2 - w^2} + 2m\, dw\, dz - m^2 dz^2}$; ut hæc sit summabilis, assumatur $m\, dz = \frac{4w^2 dw}{a^2}$, adeoq; $dx = dw - \frac{4w^2 dw}{a^2}$: $dy = \frac{-3a^2 w + 4w^3}{a^2 \sqrt{a^2 - w^2}} dw$. Quarum integrales per communes Methodos inveniuntur $x = w - \frac{4w^3}{3a^2}$, $y = \frac{a^2 - 4w^2}{3a^2} \sqrt{a^2 w^2}$:

Exemp. 3. Invenire Curvam æqualem Ellipticæ. Sit $2r$ latus rectum, $2a$ latus transversum, tum $s = \frac{r\sqrt{a^2 - w^2}}{a}$, unde erit $ds^2 = \frac{r^2 w^2 dw^2}{a^4 a^2 w^2}$, adeoque $dy = \sqrt{\frac{r^2 w^2 dw^2}{a^4 - a^2 w^2} + 2m\, dw\, dz - m^2 dz^2}$; ut hæc sit summabilis assumatur $m\, dz = \frac{2a + 2r}{a^3} w^2 dw$: unde $dx = dw - \frac{2a - 2r}{a^3} w^2 dw$. $dy = dw \sqrt{\frac{r^2 w^2}{a^4 - a^2 w^2} + \frac{4a + 4r}{a^3} w^2 + \frac{2a + 2r|^2}{-a^6} w^4}$; quarum In-

re-

tegrales per Methodos notissimas inveniuntur $x = a - \frac{2a - 2r}{3a^3} w^3$, $y = \frac{2a^3 - ra^2 - 2aw^2 - 2rw^2}{3a^2} \sqrt{a^2 - w^2}$.

Exemp. 4. Invenire Curvam æqualem Parabolæ Cubicali cujus æquatio sit $3a^2 s = w^3$. Unde $ds^2 = \frac{w^4 dw^2}{a^2}$ & proinde $dy = \sqrt{a^{-4} w^4 dw^2 + 2m dw dz - m^2 dz^2}$; Ut hæc sit summabilis assumatur $m dz = \frac{w^2 dw.}{2a^2}$ Unde $dx = dw - \frac{w^2 dw}{2a^2} \sqrt{3w^2 + 4a^2}$. Quarum integrales per Methodos vulgo notas sunt $x = w - \frac{w^3}{6a^2}$, $y = \frac{2}{9} + \sqrt{3w^2 + 4a^2}$.

Ex aliis infinitis valoribus quantitatis $m dz$ debitè assumptis infinitas invenias Curvas datæ æquales. Tu verò, *vir Eruditissime*, facilè percipias hoc Problema aliquam habere cum Problemate quodam Diophantæo affinitatem: Problema Diophanti est, dividere summam duorum Quadratorum in duo alia quadrata, quorum latera sint rationalia; & Problema *Bernoullii* est, dividere summam duorum Quadratorum in alia duo Quradrata, quorum latera sint summabilia. Sicut Problematis *Diophantæi* solutio a vulgari tantùm Algebrâ dependet, sic *Bernoulliani* Problematis solutio communes tantùm Fluxionum Methodos inversas requirit: utriusq; artificium in debitâ laterum quæsitorum assumptione consistit; scil. *Diophantæum* ut sint rationalia, *Bernoullianum* ut sint summabilia.

III. Part